CLAIMS

1. In a substrate processing apparatus that continuously processes a plurality of substrates,

a substrate processing apparatus characterized by being equipped with

a conveyor chamber constituting a substrate convey space,

a plurality of process chambers that carry out substrate processing,

a substrate convey apparatus provided in said conveyor chamber having a function of conveying substrates, and

a control section that controls convey processing of substrates by the substrate convey apparatus so that, in a case in which after a substrate is continuously processed by two or more process chambers, the substrate is re-conveyed from the last process chamber to any of the two or more process chambers other than the last and return processing implemented, in the re-conveyance the substrate is conveyed to said any of the process chambers after being temporarily retracted to a place other than a process chamber.

2. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized in that

processing at each process chamber in the return processing is the same processing as processing carried out a preceding time in each of the process chambers.

3. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized in that

processing at each process chamber in the return processing is processing under different conditions from processing carried out a preceding time in each of the process chambers.

4. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized, with respect to a single substrate, by carrying out a number of processings that is the same as, or greater

than, the number of process chambers connected to the conveyor chamber.

5. In the substrate processing apparatus as described in claim 4,

a substrate processing apparatus characterized in that it forms on the single substrate a number of laminated films that is the same as, or greater than, the number of said process chambers.

6. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized in that the control section controls convey processing of substrates by the substrate convey apparatus so that a second substrate is conveyed to a first process chamber after processing of a first substrate at the first process chamber and conveyance of the first substrate to a next process chamber has been completed.

7. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized in that the place other than a process chamber to which the substrate is retracted is in a preliminary chamber connected to the conveyor chamber.

8. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized in that the place other than a process chamber to which the substrate is retracted is in a load-lock chamber connected to the conveyor chamber.

9. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized in that in a case in which the substrate process time in each of said two or more process chambers is equal, taking n as number of process chambers subject to return processing and T as substrate convey time between processing chambers, the retraction time used by the control section is $\{(n-1) \cdot T\}$.

10. In the substrate processing apparatus as described in claim 1,

a substrate processing apparatus characterized in that in a case in which the substrate process time in any of said two or more process chambers is different, taking n as the number of process chambers subject to return processing, T as

substrate convey time between processing chambers and Pmax as the maximum substrate process time among said two or more process chambers, a retraction time used by the control section is a result of adding the difference between Pmax and the substrate process times in each of the process chambers in which return processing is implemented to $\{(n-1) \cdot T\}$ in respect of all of said process chambers.

11. In the substrate processing apparatus as described in claim 9 or claim 10,

a substrate processing apparatus characterized in that substrate process time in the process chambers is defined as the time from the closing of a gate valve separating the process chambers and the conveyor chamber to the opening of the gate valve after processing of the substrate has been carried out.

12. In the substrate processing apparatus as described in claim 9 or claim 10,

a substrate processing apparatus characterized in that the convey time is defined as the time from the opening of a gate valve separating the transfer origin process chamber and the conveyor chamber to the convey of the substrate subject to convey to the transfer destination process chamber after it has been held by the substrate convey apparatus, and the closing of the transfer destination gate valve.

13. In a substrate processing apparatus in which a plurality of process chambers connected to a conveyor chamber are accommodated in a single substrate convey apparatus and continuous substrate processing is carried out in two or more process chambers P1, P2, ···, Pj (j here being a natural number of two or more) of said plurality of process chambers,

a substrate processing apparatus characterized in that it is equipped with a control section that controls substrate convey processing by the substrate convey apparatus so that in a case in which return processing is implemented in which, from the final process chamber Pj to carry out the continuous processing, the substrate is re-conveyed to any process chamber Px ($1 \# x < j$) of the continuous-processing process chambers and continuous processing carried out in

the order Px, ···, Py ($x \leq y \leq j$), when a substrate is returned from the final process chamber Pj to a process chamber Px, the substrate is conveyed to the process chamber Px after being temporarily retracted to a place other than a process chamber.

14. In a semiconductor device manufacturing method of manufacturing semiconductor devices by continuous processing of a plurality of substrates,

a semiconductor device manufacturing method characterized in that, in a case in which after a substrate is continuously processed by two or more process chambers, the substrate is re-conveyed from the last process chamber to any of the two or more process chambers other than the last and return processing implemented, in the re-conveyance the substrate is conveyed to said any of the process chambers after being temporarily retracted to a place other than a process chamber.